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(54) Title: METHODS FOR USING PET MEASURED METABOLISM TO DETERMINE COGNITIVE IMPAIRMENT

(57) **Abstract:** A non-invasive, early stage method to obtain quantitative measures of mild cognitive impairment useful in diagnosing and following degenerative brain disease or closed head injuries, and monitoring the progress of treatment of disease or injury, by utilizing the image data from individual patient positron emission tomographic scans to construct a cognitive decline index that serves as a tool to reveal the onset of mild cognitive impairment and nervous system dysfunction which are sequelae of degenerative brain diseases and closed head injury. The method involves using weighted values of brain region intensities derived from comparing scans of normal subjects to a scan of the patient to calculate a cognitive decline index that is useful as a diagnostic tool for mild cognitive impairment. The weights for the intensity values for each region are derived from the differences of intensity values from regions of the brain of the patient selected by comparing the patient to normal control subjects. Weighted intensity values are used as inputs to a trainable, artificial neural network used to construct the cognitive decline index.